



HEASARC
High Energy Astrophysics
Science Archive Research Center

HEASARC Activities at GSFC/Active GOF's/HUG 2006 Recommendations

Steve Drake

October 15-16 2007
HEASARC Users Group



Recent HEASARC Highlights

- NRC Review of HEASARC and RXTE & XMM-Newton GOFs (June 2007)
- Archive & Downloads:
 - HEASARC archive capacity increased by 14 GB in Summer 2007, and is now ~ 33 TB
 - Rapid Growth of total archive size (x 2 in last 2 years) to about 16 TB
 - Data downloaded in a year is ~2 x archive size
 - Primary transfer mechanism is now http (not ftp) protocol
- Mission Archives:
 - Rapid Growth of Swift Archive size to 5 TB (now 1st in volume)
 - Opening of Suzaku Archive in June 2007
 - INTEGRAL Archive is now 2nd-largest in size (3.5 TB)
- Software:
 - Browse v8.0 release (tabbed results page option) (June 2006)
 - Browse v8.1 release (Chandra FOV search) (October 2006)
 - XSPEC v12.3 release (July 2006)
 - HEASoft 6.3 release (more Suzaku & Swift tools) (July 2007)

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Recent HEASARC Highlights

- Browse Usage, Tables and Catalogs
 - 11.2 million table queries by users in 2006 (cf. 9.3 million in 2005)
 - As of October 2007, there are nearly 500 `internal' Browse tables
 - Now have ~30 XMM-Newton source catalogs & ~60 Chandra source catalogs in Browse
 - XMM-Newton Serendipitous Source Catalog, v2 (247,000 detections of 192,000 unique sources) released in August 2007
- SkyView
 - 1.2 million SkyView images generated in 2006 cf. 2.7 million in 2005 (drop due to promotion of `SkyView in a Jar')
 - New Java based SkyView engine released in May 2007 along with new SkyView hardware (number of images generated per month is now back to 2005 level)
- HEASARC Web site:
 - Basic HEASARC web site design is unchanged since mid-2006
 - 2.9 TB of HEASARC web pages (excluding data) downloaded in 2006
 - Astro-Update: one-stop shop for latest version of many common astronomical software packages



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<http://heasarc.gsfc.nasa.gov/docs/heasarc/astro-update/>

ASTRO-Update: Keep your astronomy analysis software up-to-date

Ordered by Date of last update of released software

Software			
Name	Responsible Entity	Version	Last Update
HEASoft: Multi-Mission High Energy Analysis software	HEASARC	6.3.2	24 Sep 2007
fv: Fits File Viewer	HEASARC	5.0	18 Sep 2007
PIMMS: Portable, Interactive Multi-Mission Simulator	HEASARC	3.9c	12 Sep 2007
MIDAS: Munich Image Data Analysis System	ESO	07SEPpl1.0	03 Sep 2007
CFITSIO: FITS file access subroutine library	HEASARC	3.06	27 Aug 2007
CIAO: Chandra Interactive Analysis of Observations (Beta)	CXC	4.0 Beta 2	23 Aug 2007
XSPEC: X-ray spectral Analysis software	HEASARC	12.3.1aj	13 Aug 2007
PROFIT: Visualize and Model Spectra	Smith/HEASARC	2.0.0	07 Aug 2007
SAS: XMM-Newton Science Analysis Software	XMM-SOC	7.1.0	10 Jul 2007
STDAS: Space Telescope Science Data Analysis System	STScI	3.7	15 Jun 2007
STScI Python: includes PyRAF, PyFITS, Numdisplay, MultiDrizzle for HST	STScI	2.5	15 Jun 2007
PINTofALE: Package for Interactive Analysis of Line Emission	Drake & Kashyap/CXC	2.6	07 Jun 2007
CIAO: Chandra Interactive Analysis of Observations (Release)	CXC	3.4.0	16 May 2007
ISIS: Interactive Spectral Interpretation System	CXC	1.4.7	May 2007
W3Browse: Astrophysics Observation Database and Archive browser	HEASARC	8.2	29 Mar 2007
XSTAR: physical conditions and emission spectra of photoionized gases.	Kallman/HEASARC	2.1kn7	24 Mar 2007
Aladin: An interactive software sky atlas	CDS; ULP/CNRS	4.011	Feb 2007
OSA: INTEGRAL Off-Line Scientific Analysis Software	ISDC	6.0	15 Jan 2007

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HEASARC Online Holdings

- 22 TB storage allocated, 18 TB served from HEASARC servers, HEASARC archive capacity is now ~ 33 TB.

HEASARC Archive Upgrades

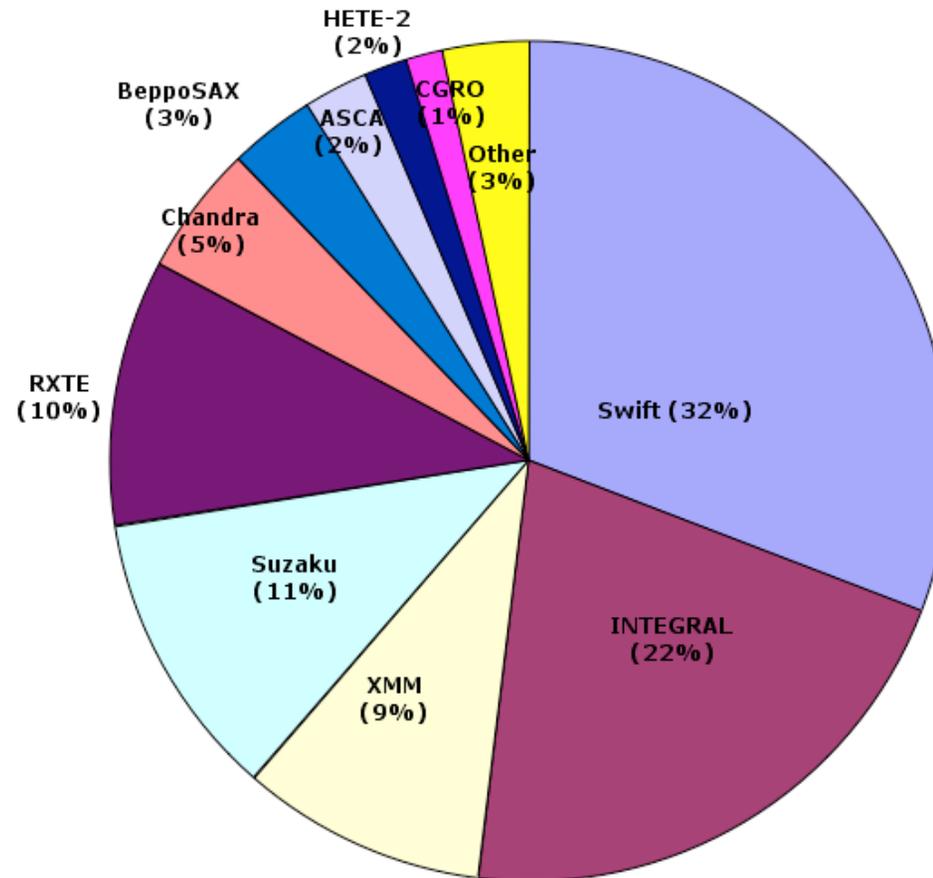
- All HEASARC servers are now Linux boxes (no more Dec-alphas)
- 14 TB of additional storage added to Network Appliance filers.
- Due to Swift and Suzaku reprocessing, disk allocations are > 2x the actual space required by their archives. Future growth in 2008 will be re-analyzed early in 2008. Factors will be the progress in reprocessing and the GLAST launch schedule.
- Additional 14 TB added to the HEASARC online backup facility in GSFC Bldg. 28
- LTO4 tape library procured for tape backups for deep offsite storage facilitated by HEASARC/NSSDC MoU. All holdings are to be migrated to this new high capacity media.
- All HEASARC hardware will be replaced when the facility is moved to the new GSFC Bldg. 34 in 2009-2010.

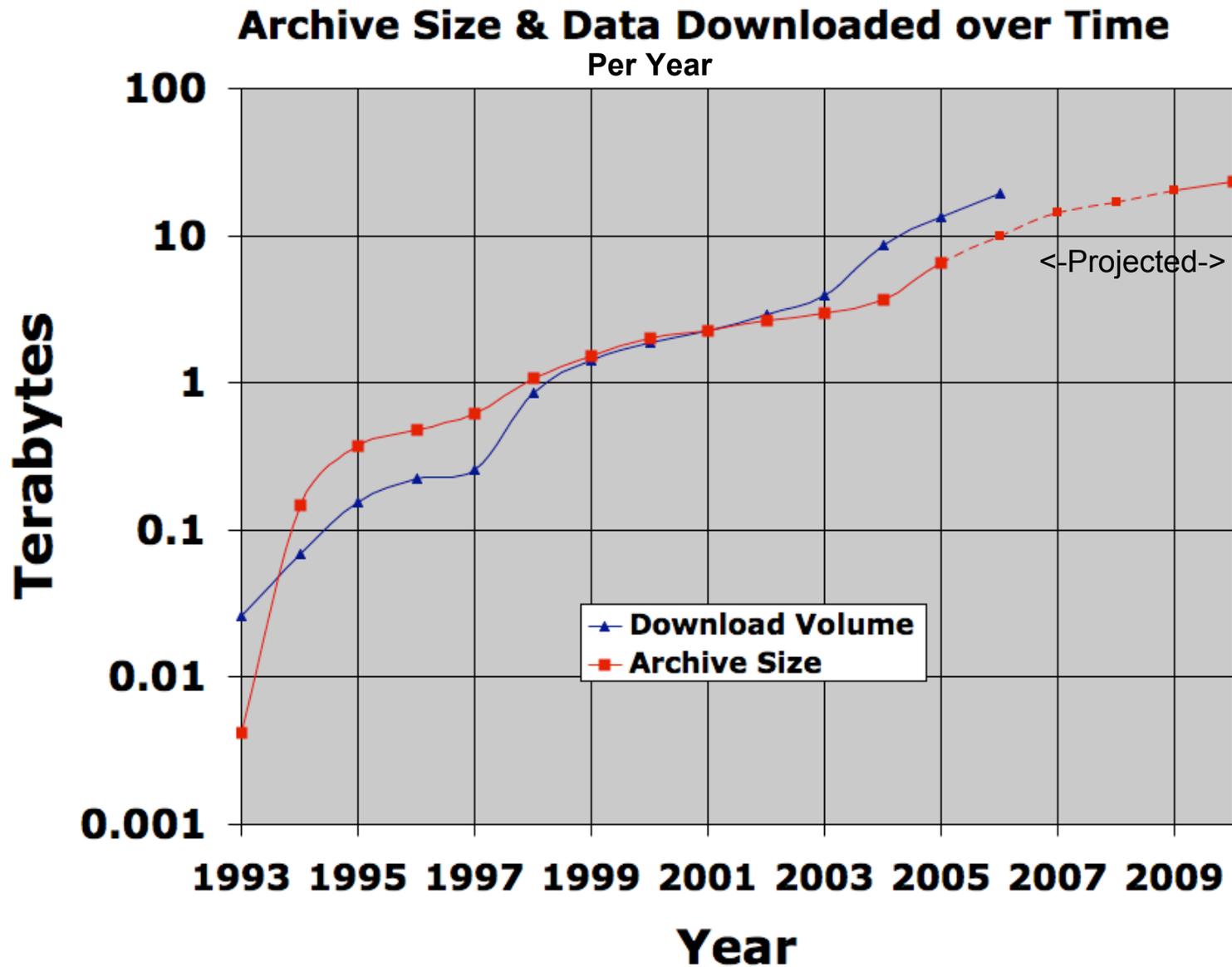
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Current (October 2007) 16.4 TB Contents of HEASARC Public Archive

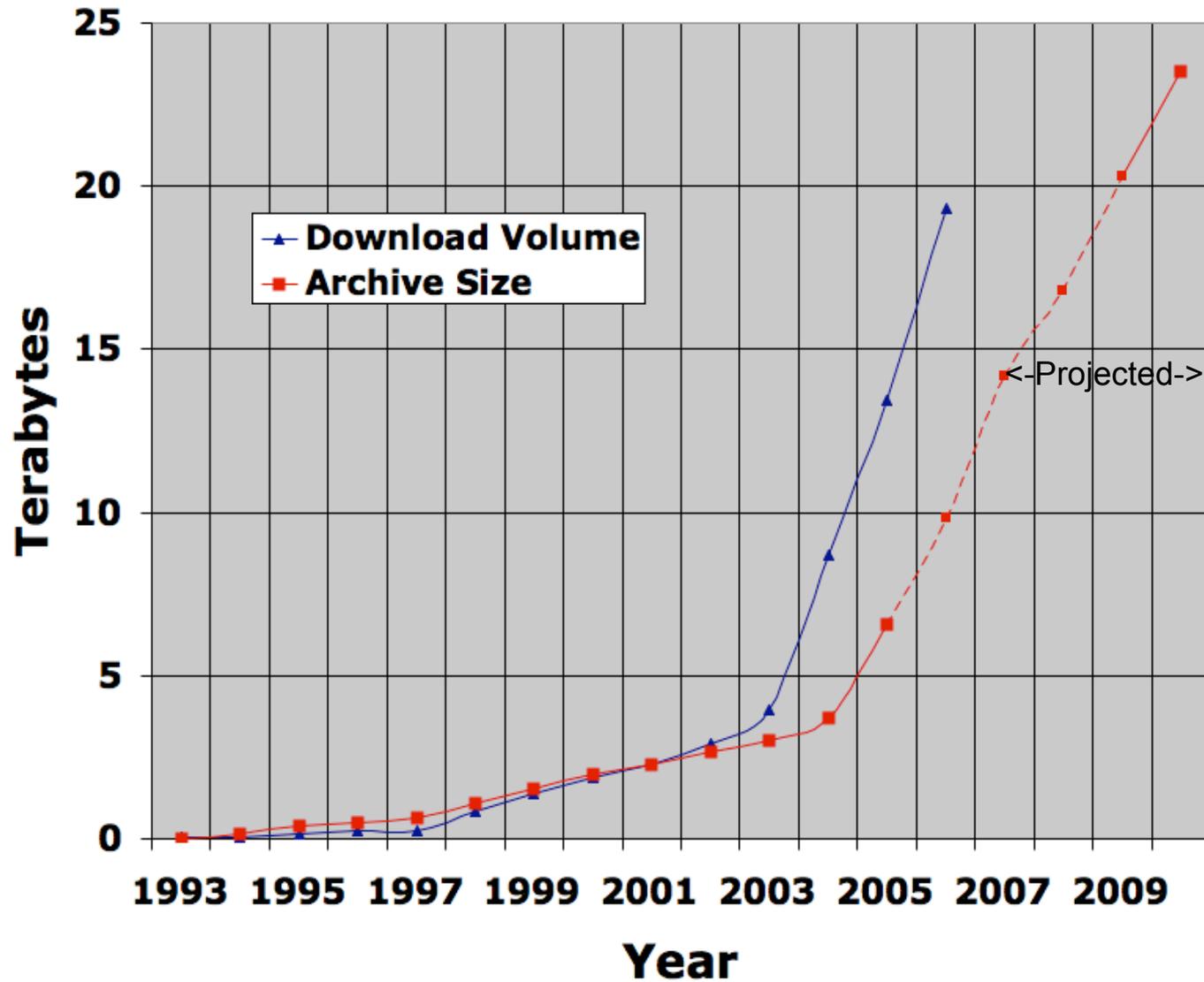




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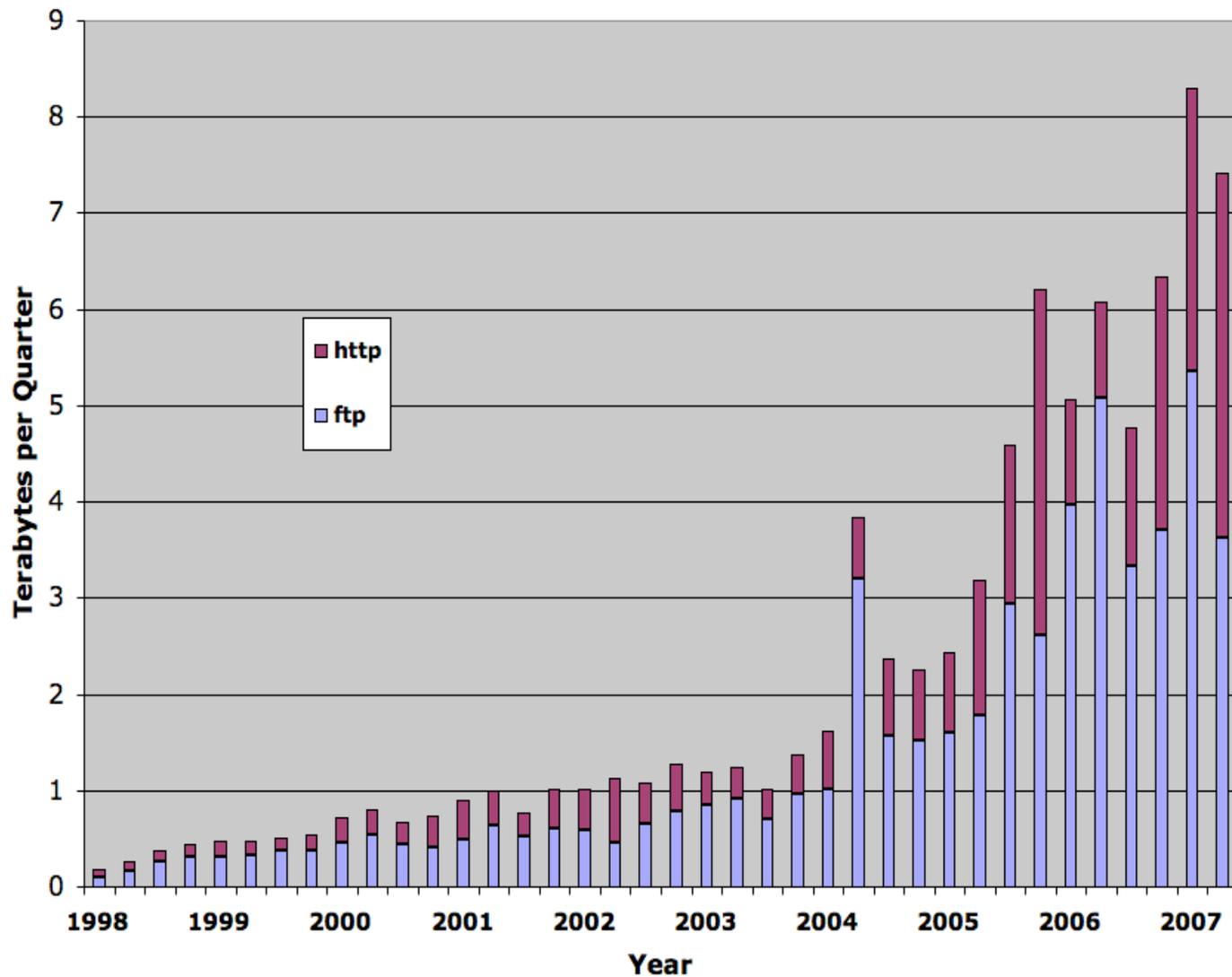
Archive Size & Data Downloaded over Time



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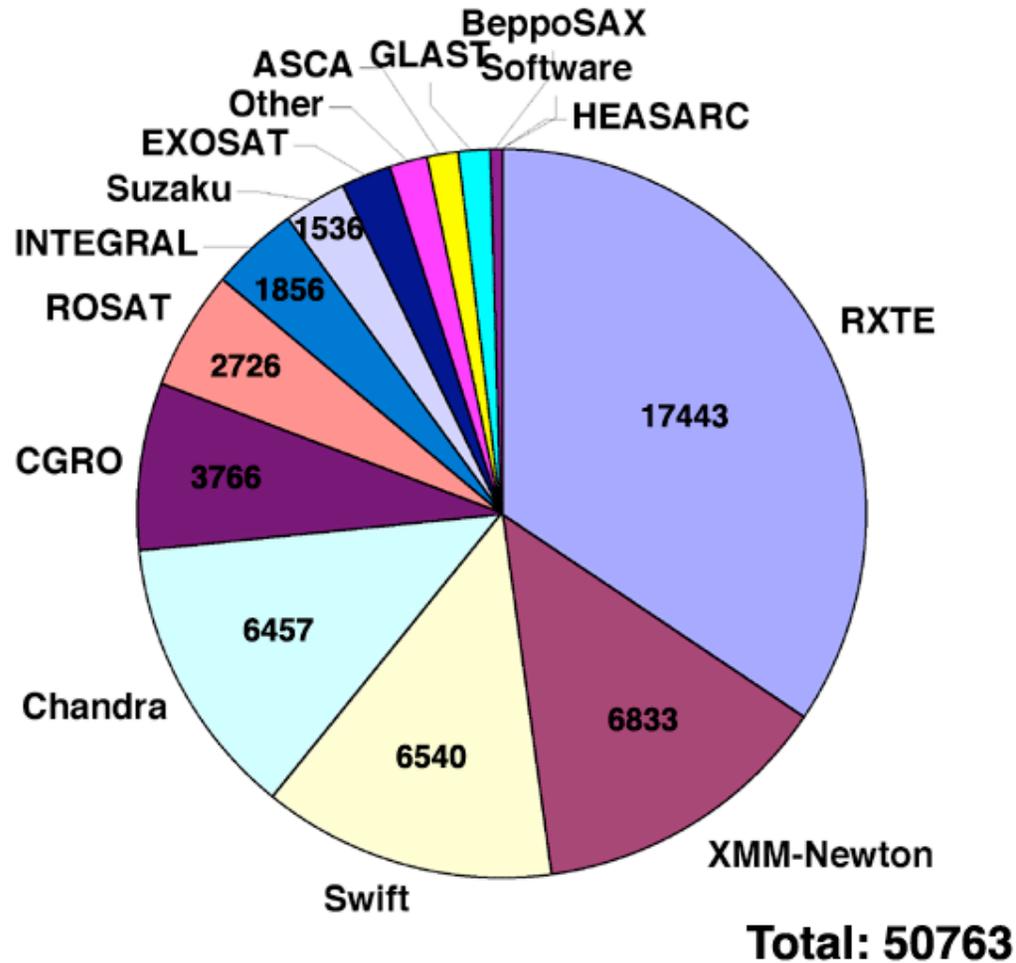
HEASARC Data + Web Pages Downloaded Per Quarter



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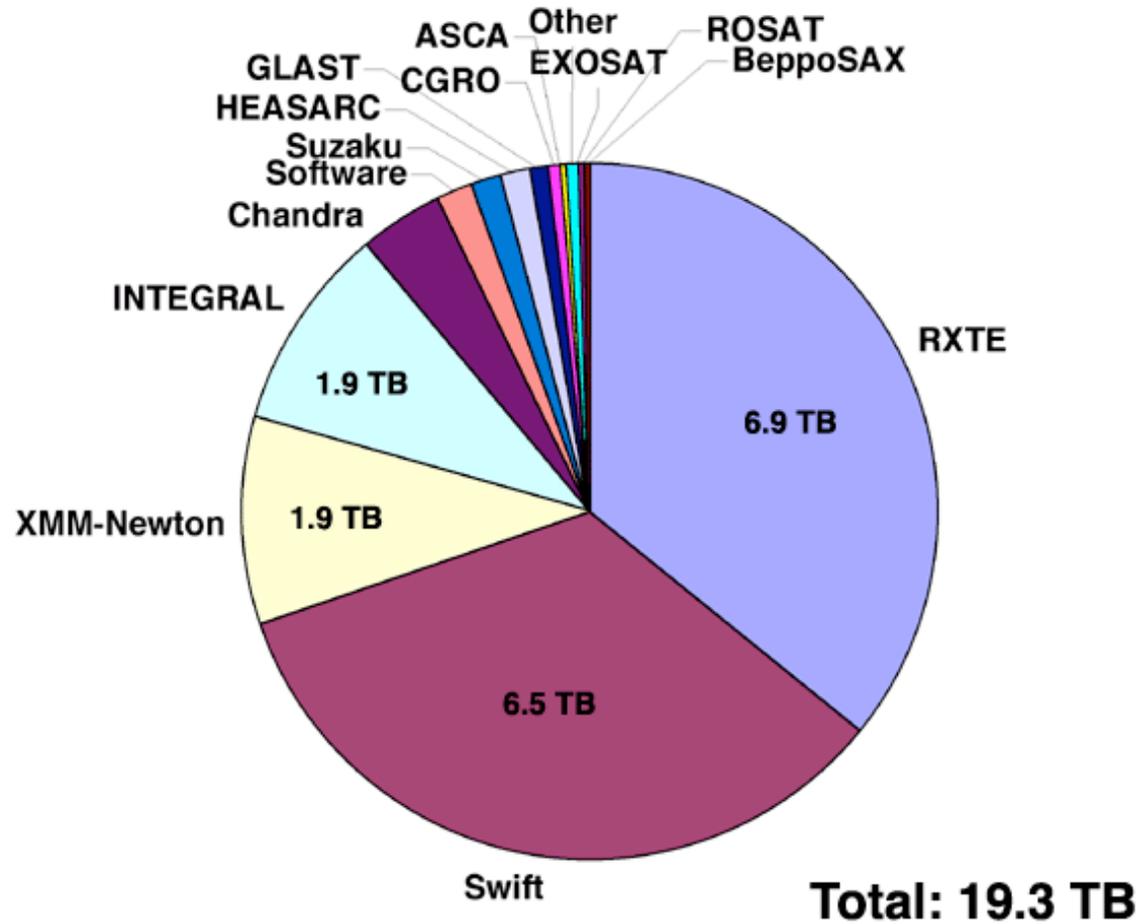


2006 Dataset Downloads by Mission





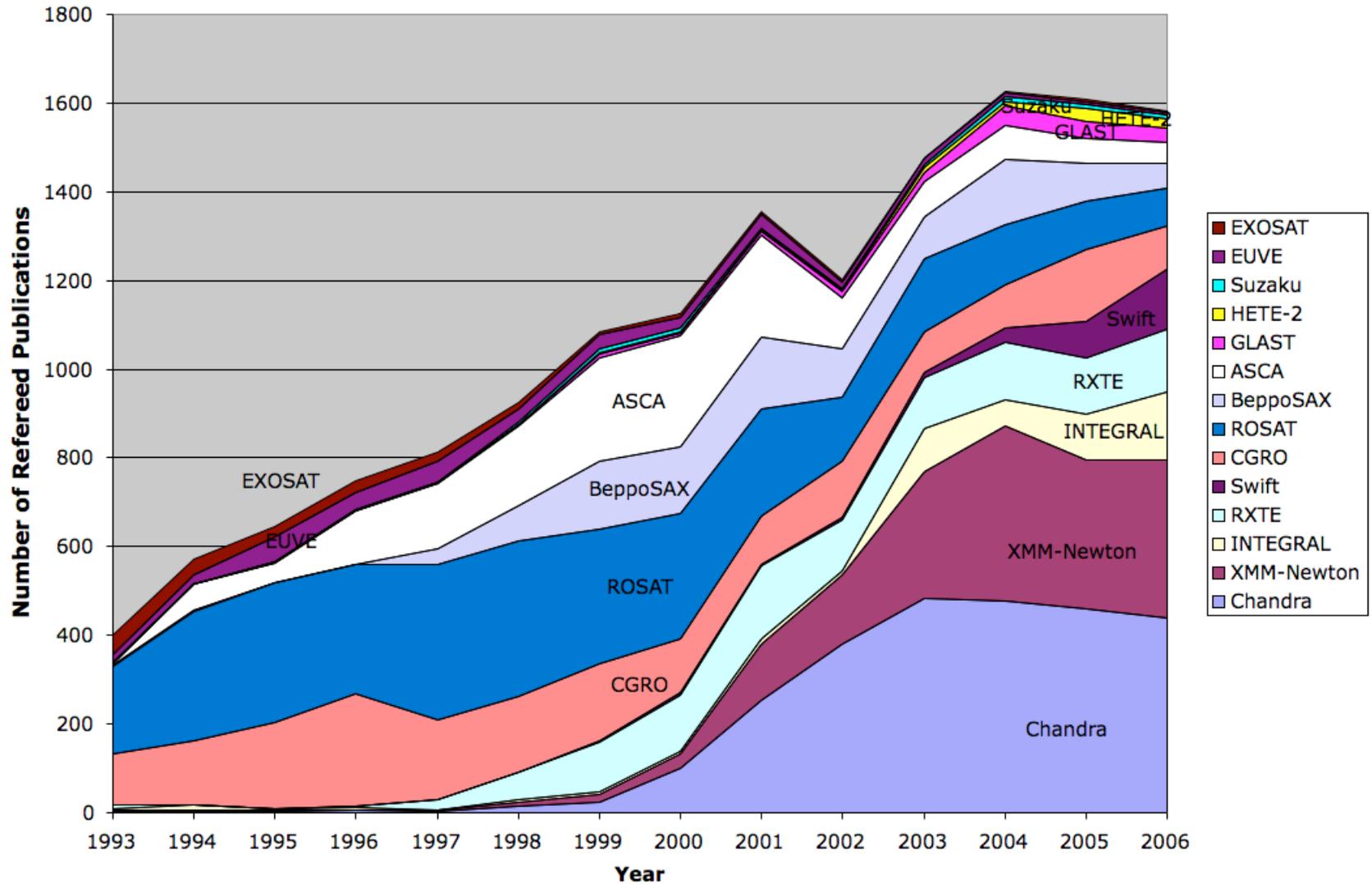
2006 Downloads by Mission in TB





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HEASARC Missions Refereed Publications



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GLAST Mission and Archive

- GLAST launch is currently still manifested for February 5, 2008, although it will likely occur 2 or 3 months later
- Cycle 1 GI program received 167 proposals (~4x oversubscription)
 - Peer Review in December 2007, selections in Spring 2008
- GLAST Data products and Deep Archive:
 - Almost all FITS file formats for LAT and GBM have been finalized
 - Distribution plan for Cycle 1 high-level LAT products is being finalized
 - Agreement in place with NSSDC for a deep archive of GLAST Level 0 data
- GLAST/HEASARC documents (PDMP, MoU, ICD) are near-finalized and/or about to be signed
- Draft GLAST tables in Browse are defined & there has been limited testing (but the structure of the catalogs is still in flux)
- CALDB issues:
 - A prototype GLAST CALDB is under construction
 - There is a draft of a CALDB/GLAST definition document
- **β -testing of GLAST science (SAE) software starting in mid-December: volunteers from the HUG are solicited (shrader@milkyway.gsfc.nasa.gov)**
- For a fuller discussion of GLAST issues, refer to the appendix of this presentation which contains a number of slides provided by the **HEASARC scientist responsible for GLAST, Mike Corcoran**



INTEGRAL Mission and Archive

- Project
 - Spacecraft and instrument operations remain nominal
 - INTEGRAL AO5
 - Deadline: April 2007; Oversubscription factor: 5.9
 - Results announced: July 2007-- 25/127 accepted proposals have US PI, and, including Co-Is, US scientists are involved in 51% of accepted proposals
 - Stage 2 budget review is now ongoing
 - INTEGRAL GOF has been reduced to 1 person for last 6 months (now back to 2)
 - '5 Years of INTEGRAL Science' Workshop to be held in Sardinia (October 2007)
- Archive & Catalog Tables
 - **HEASARC scientist responsible for INTEGRAL Archive is Steve Drake**
 - 1.9 TB of INTEGRAL data downloaded in 2006
 - INTEGRAL Data Archive is now 3.3 TB
 - Major reprocessing (v.3) of INTEGRAL data planned by ISDC in early 2008
 - Now have 3 INTEGRAL Project tables & 6 INTEGRAL catalogs in Browse
 - Significant updates to INTEGRAL Bright Source Catalog
 - Now includes data through March 2006
 - Contains ISGRI lightcurves and longterm average count rates for 312 bright sources
- Software
 - Version 7 of the INTEGRAL OSA software just released (September 2007)

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RXTE Mission and Archive

- Project
 - HEXTE Cluster A is now not rocking, but in a fixed pointing mode (Oct 2006)
 - PCU1 lost its propane layer, but minimal PCA performance impact (Dec 2006)
 - RXTE Cycle 12 results released (May 2007)
 - Updates to improve PCA background estimation (pcabackest bug fixed and a new saa_history file released) (Sep 2007) [Other updates in progress]
 - Mission-long light curves (rates & HRs for PCA & HEXTE) for frequently observed sources publically available (Dec 2007)
- RXTE Archive & Browse Tables
 - **HEASARC scientist responsible for RXTE Archive is Steve Drake**
 - RXTE Archive is now 1.8 TB, cf. to 6.9 TB of RXTE data downloaded in 2006
 - Improved population of several important fields in RXTE project tables (duration, exposure)
 - XTEPROCESS table allows users to filter on PCA and HEXTE modes that were in use for observations
- Upcoming Milestones
 - Upcoming Senior Review (Spring 2008) will review RXTE end-of mission schedule: current RXTE end date is February 18, 2009
 - Project plans to do a “final reprocessing” as an end-of mission activity, with input from user community and RXTE Users Group



Suzaku Mission and Archive

- Project
 - 3 out of 4 of the XIS CCDs are operational
- Archive
 - **HEASARC scientist responsible for Suzaku Archive is Lorella Angelini**
 - Suzaku Archive opened with v1.x processing of SWG data (June 2007)
 - v.2 processing is now completed (October 2007)
 - GO data start entering the Archive (October 2007)
 - Suzaku Archive is now almost 2 TB in size
 - In first 3 months of public archive, 0.3 TB of Suzaku data downloaded
- Other Past & Future Milestones
 - Special Suzaku issue of PASJ (January 2007)
 - GO Cycle 3 is now open: deadline for proposals is **November 30th**
 - Suzaku X-Ray Universe conference in San Diego in December 2007
 - Upcoming Senior Review (Spring 2008)



Swift Mission & Archive

- **Swift Spacecraft**
 - One of Swift gyros failed on August 11, 2007
 - Full recovery of normal Swift operations is expected soon (BAT and XRT are currently operating, UVOT is turned off)
- **Archive**
 - **HEASARC scientist responsible for Swift Archive is Lorella Angelini**
 - All data have now gone through a reprocessing (first year of the mission)
 - Swift Archive is now easily HEASARC's largest dataset in size
 - 6.5 TB of Swift data downloaded by users in 2006
 - Swift GRB table released (July 2007)
- **Software & Calibration**
 - Latest Release of software (V2.7.2) in HEASoft 6.3.2, plus calibration update (Sep 2007)
- **Milestones**
 - Swift Cycle 4 GI proposal deadline is Nov 9, 2007
 - New in Cycle 4: proposals for non-GRB non-TOO astrophysical observations will be welcome, in addition to non-GRB TOO proposals and funding-only proposals accepted in previous rounds.
 - Upcoming Senior Review (Spring 2008)



XMM-Newton Mission & Archive

- Project issues:
 - Spacecraft and instrument operations are nominal
 - XMM-Newton AO-7 deadline ~ 1 week ago: 586 valid proposals asking for 11.38 Ms, an oversubscription rate of 7.8
 - XMM-ESAS EPIC MOS particle background modeling package released; 2 papers (Kuntz et al. and Snowden et al. 2007) have been accepted for publication
 - Work on EPIC PN particle background modeling is now in progress; expected to become available in early 2008
- Archive and Catalogs
 - **HEASARC scientist responsible for XMM-Newton Archive is Steve Drake**
 - About 1.5 TB of XMM-Newton data in the archive
 - 1.9 TB of XMM-Newton data downloaded in 2006 (not including ESA Archive)
 - Browse now has ~30 XMM-Newton source catalogs including the XMMSSC v2 and the XMM Slew Catalog
 - MAST now has links to XMM-Newton Optical Monitor data and a source catalog (Kip Kuntz, Steve Snowden, Ilana Harrus): the OM Catalog paper has been submitted for publication



Response to Comments and Recommendations from HUG 2006: 1

1a. We have one practical request: with further development [of Hera], undoubtedly at some point there will be back-compatibility issues, which could hamper large-volume, or long time-interval analysis projects that straddle the break (these could be as simple as just a redefinition of a quantity, not even a technical software issue). It would be very helpful if outside users could have access to a stable (backup) version of Hera."

We do not have the resources to routinely provide access to entire previous releases of the software, but on request, we could make available an older version of any specific program. (There have been no such requests to date).

1b. Some logging capability that records the commands and parameters of each step [within Hera] would be extremely useful (i.e., so that a process once developed can be repeated consistently).

An improved command-line window, with logging capability, was added to Hera shortly after the last HUG meeting.



Response to Comments and Recommendations from HUG 2006: 2

2. The HEASARC study the feasibility of implementing the correct, detailed field of view associated with a given dataset when searching by position. We view this as an important issue, because the labor-intensiveness of working with cone searches really does inhibit important science.

The HEASARC has implemented this in the Swift Browse Interface for the BAT FOV (<http://heasarc.gsfc.nasa.gov/cgi-bin/W3Browse/swift.pl>) and in the Chandra FOV Interface (http://heasarc.gsfc.nasa.gov/W3Browse/chanfov_hea.html), and as a service on the Browse results page ('F'). Other missions with simpler FOVs have not been done.

1b. Some logging capability that records the commands and parameters of each step [within Hera] would be extremely useful (i.e., so that a process once developed can be repeated consistently).

An improved command-line window, with logging capability, was added to Hera shortly after the last HUG meeting.



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HEASARC: NASA's X-ray & Gamma-ray Astronomy Data Archive

http://heasarc.gsfc.nasa.gov/

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HEASARC Tip:
The HEASARC provides a list of [proposal deadlines and future mission launches and upcoming meeting announcements](#) as a service to the science community.
[View all tips](#)

The High Energy Astrophysics Science Archive Research Center (HEASARC) is the primary archive for high-energy astronomy missions, in the extreme ultraviolet, X-ray and gamma-ray wavelengths. The HEASARC provides archival data, multi-mission software and analysis tools, and information about current and past observatory missions.

Archive Data Search Form [More Search Options](#)

Search criteria: exposure>10000 X-ray "AR Lac"

Enter positions, times, missions, ... to query Browse.
Try **ROSAT 3c273** to get ROSAT data on 3c273 or **chandra bil>80 status=archived** to get archived Chandra data near the north galactic pole. Use quotes around targets that have embedded white space (e.g., 'ar lac').

- [More examples and interactive feedback](#)
- [Detailed help on the options](#)

HEASARC Picture of the Week


APOD: Astronomy Picture of the Day


[More Images](#)

Latest News

- [NASA Astronomers Find Bizarre Planet-Mass Object Orbiting Neutron Star](#) (12 Sep 2007)
- [An Early Release version of the Hubble Legacy Archive is available](#) (24 Aug 2007)
- [HEASOFT 6.3.1 software suite has been released](#) (27 Jul 2007)
- [New releases of the interfaces to the nh and X-ray background tools are available.](#) (5 Jul 2007)
- [The Suzaku public data archive is now open](#) (1 Jun 2007)

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Response to Comments and Recommendations from HUG 2006: 3

4. We have serious concerns with respect to the coordination of software development for GLAST between the GLAST project and the HEASARC...

We are not aware of any outstanding issues in this area. GLAST files conform to HEASARC FITS standards according to the Project. The GLAST Project is presently preparing a GLAST FTOOLS package for release next year.

5. We have detailed responses to Keith Arnaud's XSPEC status presentation... joint spatial/spectral analysis capability, etc.,

This will be addressed in Keith's XSPEC presentation later today

6. We do suggest that the site could have a 'higher ed' link, in addition to the E/PO material, where lectures, presentations, and reviews could be stored, for use in professional talks and reviews, as well as astronomy and physics classes.

This has been implemented on the HEASARC Resources page:
<http://heasarc.gsfc.nasa.gov/docs/heasarc/resources.html>



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HEASARC Tip:

You can view [the Browse tips archive](#) to learn useful shortcuts and power search tools.

[View all tips](#)

Resources for Scientists

Presentations

To add your presentations, contact [Karen Smale](#)

- [Observational Cosmology](#) (PPT) *Courtesy: Jonathan Gardner*
- [Online Proceedings](#) of High-Energy Astrophysics Meetings
- [Seminars](#) in NASA's Astrophysics Science Division Director Series
- [Space Astrophysics course at GWU](#): lecture slides and notes *Courtesy: Mike Corcoran & William Parke*
- X-ray Astronomy Schools
 - [2007 5th International School](#) (Washington, DC, USA)
 - [2006 1st \(European\) X-ray Astronomy School](#) (Athens, Greece)
 - [2005 4th International School](#) (Cambridge, Mass., USA)
 - [2003 3rd International School](#) (Wallops Island, Virginia, USA)
 - [2003 COSPAR School](#) (Udaipur, India)
 - [2002 2nd International School](#) (Berkeley Springs, West Virginia, USA)
 - [2001 COSPAR School](#) (INPE, Sao Jose dos Campos, Brazil)
 - [2001 1st International School](#) (Greenbelt, Maryland, USA)
- [X-ray Timing](#) *Courtesy: Paul Ray*

General Astronomical Image Collections

- [Astronomy Picture of the Day \(APOD\)](#)
- [NASA Image Exchange](#)
- [NCSA Astronomy Digital Image Library \(ADIL\)](#)
- [SkyView](#) facility to "make your own sky image" at any wavelength

Astronomical Images in Specific Energy Bands or from Specific Missions

- [Chandra X-Ray Observatory \(CXO\)](#) Picture Gallery
- [Galaxy Evolution Explorer \(GALEX\)](#) Ultraviolet Image Gallery
- [High Energy Astrophysics Picture of the Week \(HEAPOW\)](#) Image Archive (mostly X-ray and gamma-ray)
- [Hubble Space Telescope \(HST\)](#) Picture Gallery (optical and UV)
- [Images, Spectra, and Light Curves](#) of Celestial High-Energy Sources (mostly X-ray and gamma-ray)

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<http://heasarc.gsfc.nasa.gov/docs/heasarc/resources.html>



Response to Comments and Recommendations from HUG 2006: 4

7. It would be very helpful if the PIMMS output listed all parameters of the model spectrum it uses, not just a selection (for instance, one frequently wants to know what the normalization constant of the model is, for use in XSPEC).

PIMMS now lists model normalizations in the output. Koji Mukai hopes to soon do a major update to PIMMS, e.g., adding new models such as APEC

Swift 1. We wondered when the BAT source catalog will become available. The HUG encourages the Swift team to produce this very useful catalog in a timely fashion.

The latest BAT AGN paper is currently being refereed. The BAT Catalog and data products will be accessible from Browse. The basic software used for this study are to be made publically available.

Swift 2. We also suggest that the HEASARC consider the feasibility of a GRB Follow-up Archive (currently, whatever optical follow-up data is publicly available is widely dispersed and possibly not always maintained).

The HEASARC did create the new version of RPS (ARK) with this functionality in mind. The GRB community, however, does not seem interested in such an online public archive.



Response to Comments and Recommendations from HUG 2006: 5

XMM 1. The HUG reiterates its concerns that the XMM analysis software operates outside the CALDB infrastructure, and it urges the HEASARC, in its contacts with the XMM project, to continue to advocate that the XMM calibration data and software be brought into this structure.

This comment has been noted by the US XMM Project: there has been no change however, in the calibration infrastructure

XMM 2. Steve Snowden's work on the synthetic background for the MOS, for use in the analysis of extended sources, is much appreciated, and its completion (and possible extension?) should have high priority.

This was already addressed in the slide on the XMM Archive



Response to Comments and Recommendations from HUG 2006: 6

RXTE 4. We suggest making a new high-end product for the RXTE GoodXenon data sets. This product would be a 'sensible' Event file...

According to Padi Boyd of the RXTE GOF:

`Making such a product available would significantly increase the size of the RXTE archive, since something like 2/3 of observations include the good_xenon mode. This is quite a cost to accomplish the goal of saving the user the step of running one tool. And all other event mode data would remain just as raw---this was only a request for a higher level product for one data mode. After this cost-benefit analysis we didn't feel this was a high priority' [in 2006].

The next 2 slides give a fuller discussion of this issue which was also provided by Padi Boyd.



Merging Good_Xe files into generic event list format

There is only one tool necessary to create a "unified" GoodXenon FITS file from the original two files (make_se).

Scope of the request:

- Roughly 2/3 of non-slew obsids include GoodXenon data.
- Preliminary tests indicate that the event files produced by 'make_se' are roughly twice the size of the input GoodXenon files.
- GoodXenon files account for about 10% of the total size of the obsid.
- Current RXTE archive: about 1.2 TB of non-slew data .

- Result would be approximately 160 GB in new products.

Requirements:

- non-trivial scripting required to produce the new products
- modification and regeneration of all affected index (FIST) files
- additional space to store them on numerous 'closed / full / deep archived' data partitions or else come up with a new symlink scheme.



Merging Good_Xe files into generic event list format

The GOF recognizes the desire to generate more generic event files from Good_Xe data, but concludes that it is too much time, space and cost to initiate the effort **at this time**, especially since software exists to do this step.

The GOF plans to do a “final reprocessing” of the standard products as an end-of-mission activity. At that time, it would be appropriate to add such improvements. We plan to use the following guidelines for adding additional products. They would need to be:

- – clearly defined
- – useful to a large segment of the RXTE user community
- – approved by the RXTE Users' Group

- A cost/staffing estimate to make and store these new products, and insure that they are available through Browse, etc. (GOF currently only has ~ 1 FTE)



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Upcoming Major HEASARC Milestones

- Late 2007: Opening for new HEASARC Director
- Early 2008: Possible Release of NASA National Virtual Observatory AO
- Winter/Spring 2008: Launch of GLAST
- April 2008: NASA Senior Review of Active Missions, incl. Chandra, INTEGRAL, RXTE, Suzaku, Swift and XMM-Newton
- May 2008: NASA Senior Review of Data Centers
- 2009-2010: Move of Astrophysics Science Division (including the HEASARC) to the new GSFC Science Building



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The GLAST Archive

Mike Corcoran

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GLAST Status

- GLAST fully integrated; Thermal vac tests at NRL
- Launch winter-spring 2008?



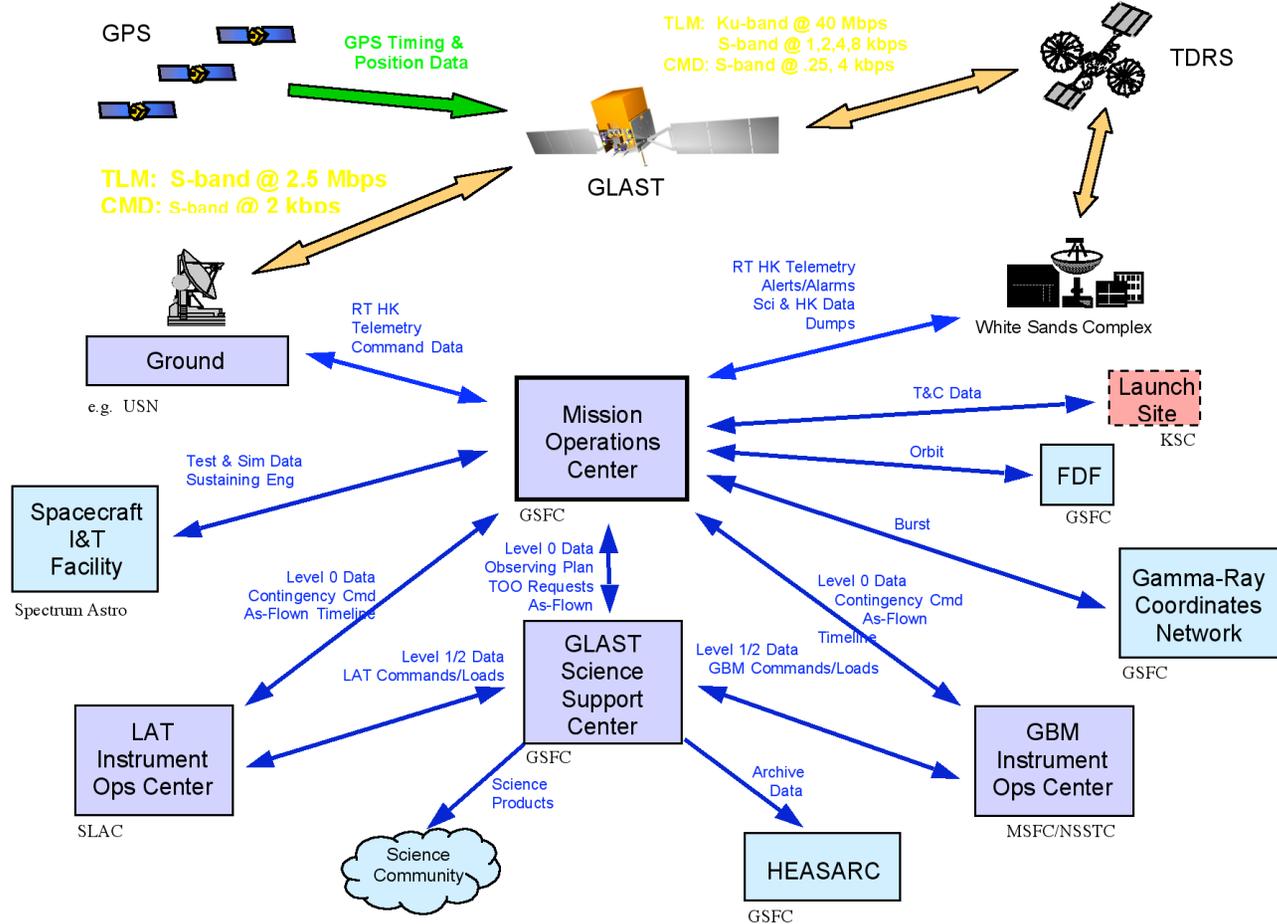
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GLAST Overview

- Next Project Reviews GSSC Detailed Design Peer Review (July 2004)
 - Flight Operations Review (Late 2007)
 - Mission Readiness Review (early? 2008)



GLAST Data Elements





Mission Phases

- Phase 0: On-orbit checkout (L to L+2 months)
- Phase 1: Sky survey (L+2 months to L+14 months); limited number of GI+ pointed observations
 - Phases 0 and 1: “restricted access period.” no LAT level 1 data (=events) will be available to any GIs who are not LAT team members. During Phase 1 the LAT team will make public data characterizing transients and lightcurves from ~20 strong, interesting sources; Data public at start of phase 2.
- Phase 2: GI phase (L+14 months): survey mode, pointed mode; data available immediately



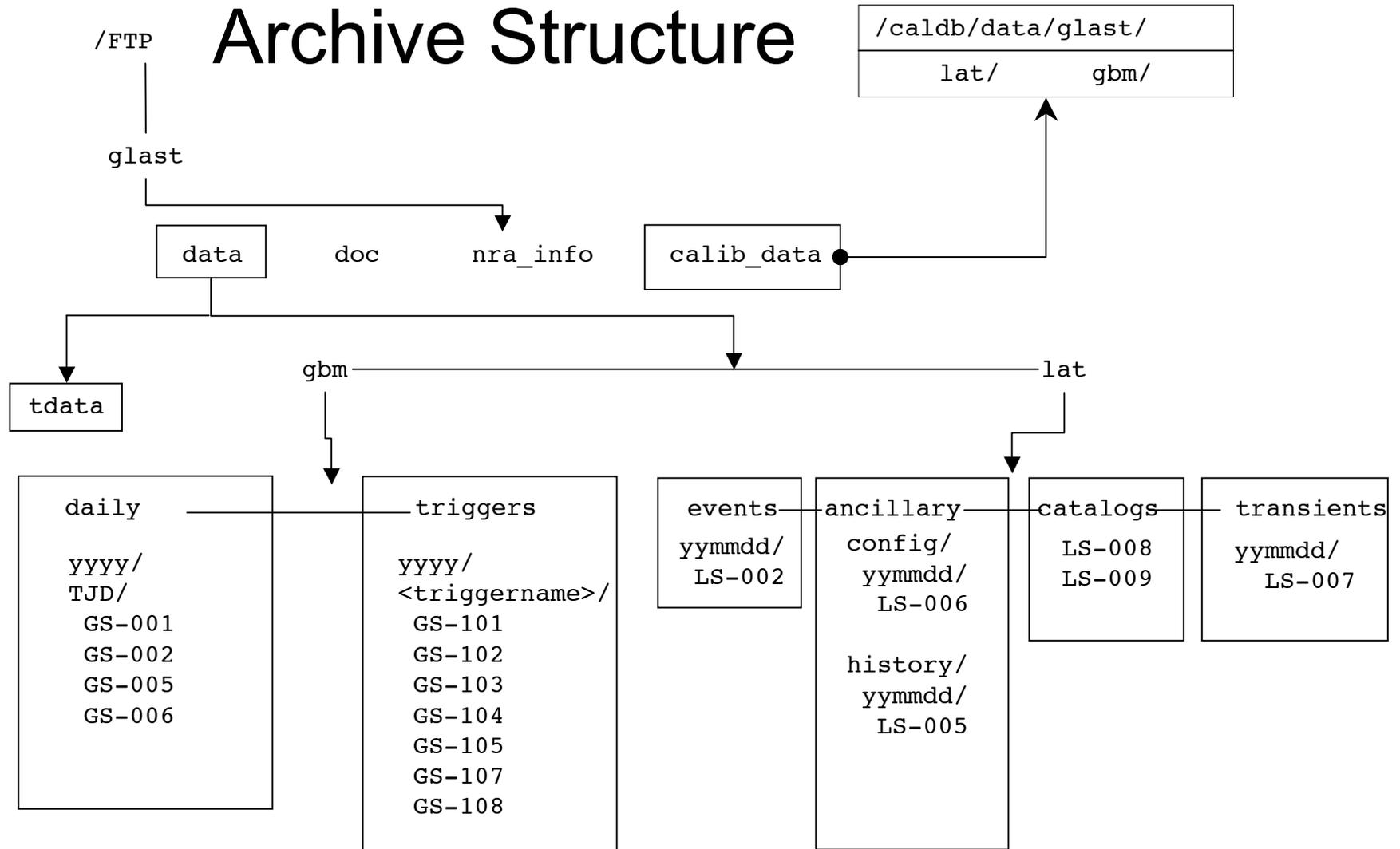
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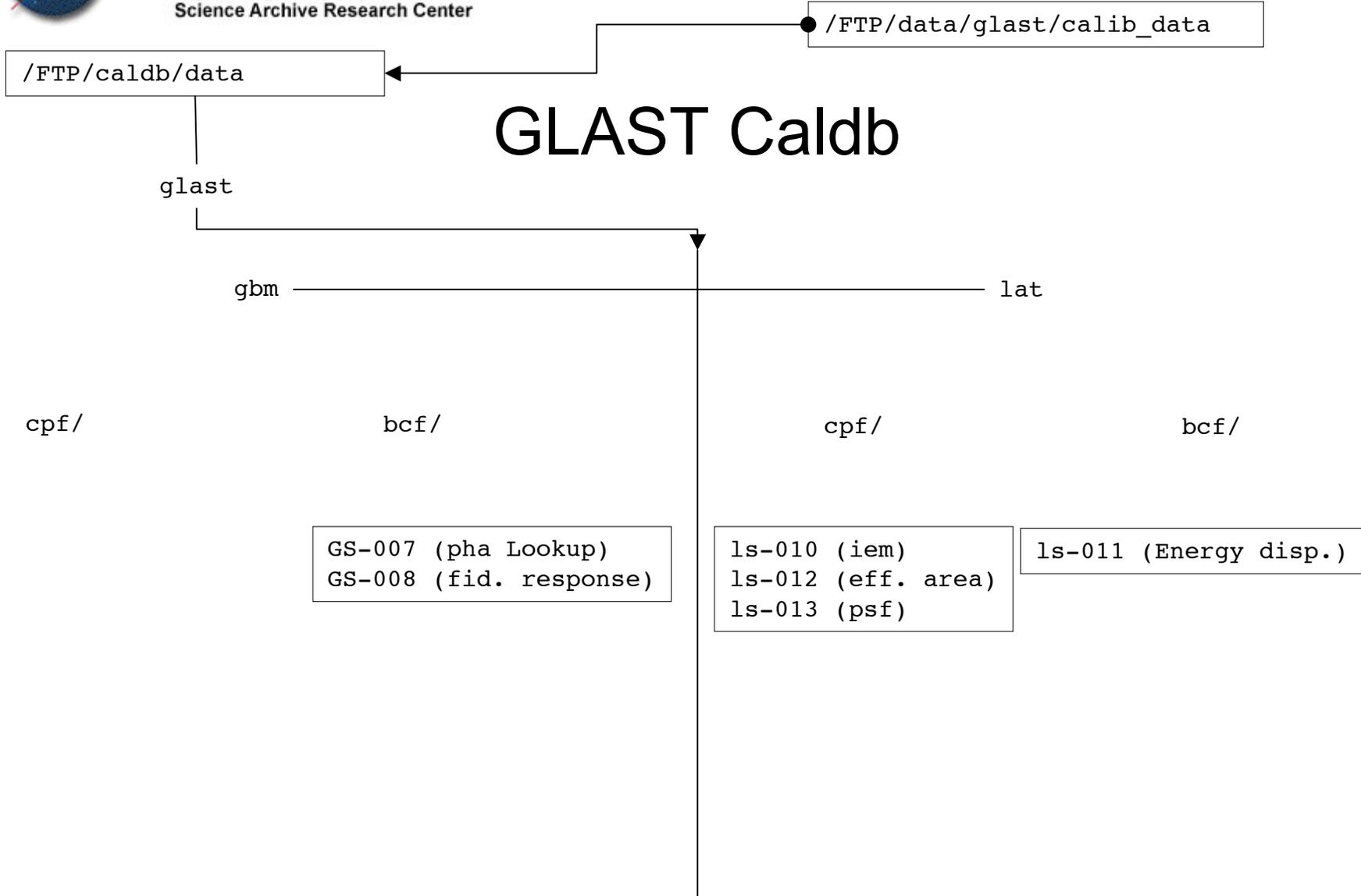
Cycle 1 Proposals

- Funding & associated observations only
- LAT: only selected data products for ~20 sources
- GBM: burst lightcurves and events
- 167 proposals received



Archive Structure





ls-010 (iem)
ls-012 (eff. area)
ls-013 (psf)

ls-011 (Energy disp.)

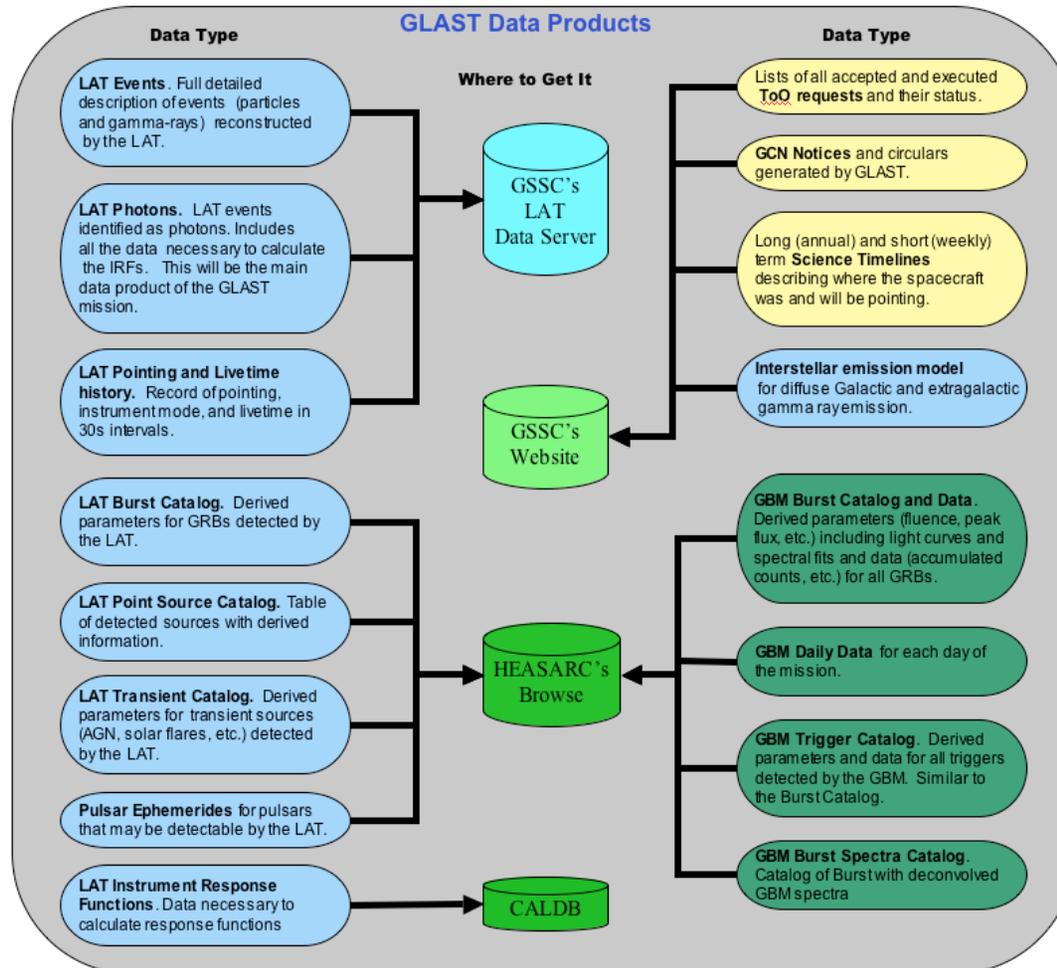


Expected Data Volumes

- Level 0: 20 TB for entire mission (CHECK)
- Level 1 data: 130 MB/day (LAT) + 2.2GB/day (GBM) = ~0.9 TB/Year
- Level 2 data: ~27 MB/day (~11GB/year)
- and a smaller volume of Level 3 data to give a total expected yearly data volume of about **1TB/year**. Assuming a 10 year mission life the GSSC will need to provide about **10 Tbytes** of data storage for the Level 1, 2 and 3 data archive.



Data Access Overview





Data Access

- FITS event files downloaded from GSSC web interface

HOME RESOURCES PROPOSALS **DATA** HEASARC HELP

+ GSSC Home

Data

Data Access
+ LAT Data
+ GBM Data

DC2 LAT Photon Query

The Photon database contains 3322371 photons covering the following dates:
Data Start Time Data End Time
Gregorian Date: 01-01-2008 00:00:01, 25-02-2008 00:00:01
Mission Elapsed Time (MET): 220838401, 225590401

Start Search Reset

1. Do you want to search around a position ... ?
Object Name Or Coordinates:
(e.g. '12 00 00, 4 12 6' or '12, 15')
J200/B1950: RA, dec
Galactic/Supergalactic: Latitude, Longitude
Object: Object Name

Coordinate System: J2000

Area to Search: 15 Circle
For a circle, enter the radius in degrees. The default radius is 15.
Box and Ellipse searches are temporarily disabled.

... and/or search by date?
Observations Dates: MJD
For Gregorian dates, please enter in the format DD-MM-YYYY HH:MM:SS, with the start and (optional) end time separated by commas.
Enter the start and (optional) end MJD in the form MMMMM.mmmmm,MMMMM.mmmmm
For MET (Mission Elapsed Time), enter any integer values >= 0, separated by commas.
If you would like to search from the beginning of the mission, put in START instead of a start value.
If you would like to search up until the most recent point, put in END instead of an end value.
If you do not enter anything, it will return results from the past 6 months.

... and/or search by energy?
Energy Range: MeV
Enter in the minimum and (optional) maximum energy, separated by a comma.

...Or search for bursts & sources using BROWSE, and download LAT/GBM data

Browse Home Search of Catalog(s) Tip Archive Hera HELP

Main Search Form > Parameter Search > Search Results > Choose Data Products

Description	Catalog	Data Default Radius (arcmin)	Mission	Table Type
GLAST Gamma-Ray Burst Catalog TESTING	glastgbm Y	300	GLAST	Object

1. Enter any constraints on the query below. [Help on constraint syntax](#)
(What about wildcards, spaces, and case sensitivity?)
2. To change the fields that are returned, select the box in the 'View' column beside each field desired.
3. To sort the results by any field, select one box in the 'Sort' column beside the field to sort on.
Examples of query constraints:

View	Sort	Parameter (Unit)	Query Terms	Min Value	Max Value	Value Type
<input checked="" type="checkbox"/>	<input type="checkbox"/>	name		081208	081408	string
<input checked="" type="checkbox"/>	<input type="checkbox"/>	start_time		1866-07-14 18:43:12	1869-07-21 20:38:24	date
<input checked="" type="checkbox"/>	<input type="checkbox"/>	stop_time		1869-07-21 20:38:24	1869-10-14 04:19:12	date
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ra		16 58 07.20	17 12 36.00	position
<input checked="" type="checkbox"/>	<input type="checkbox"/>	dec		+20 05 24.0	+36 39 00.0	position
<input checked="" type="checkbox"/>	<input type="checkbox"/>	exposure (s)		5.00000	10.00000	float
<input checked="" type="checkbox"/>	<input type="checkbox"/>	flux (cts)		2.34e+00	3.23e+00	float
<input checked="" type="checkbox"/>	<input type="checkbox"/>	flux_error (cts)		2.00e-02	2.30e-01	float

4. Do you want to change your current query settings?
Object Name Or Coordinates: (e.g. Cyg X-1 or '12 00 00, 4 12 6') Use semi-colons (;) to separate multiple object names or coordinate pairs (e.g. Cyg X-2; 12.235, 15.345)
Coordinate System: J2000
Search Radius: Default arcmin Default uses the optimum radius for each catalog searched.
Name Resolver: GRB, SIMBAD, else NED
Observation Dates: The time portion of the date is optional. Separate multiple dates/ranges with semicolons (;). Range operator is '..' (e.g. 1992-12-31; 48980.5; 1995-01-15 12:00:00; 1997-03-20 ... 2000-10-18)
Limit Results To: 1000 rows
Output Format: HTML Table
Show All Parameters: Select to display all catalog parameters instead of only defaults

5. Start Search Reset



Analysis

GLAST SAS User Workbook

[SITE MAP](#) [DCII](#)

[Home: SciTools](#) [Software Setup](#) [Data Selection](#) [Source Analysis](#) [GRB Analysis](#) [Pulsar Analysis](#) [Observation Simulation](#) [SciTools References](#) [Advanced](#) [Data Access](#)

GLAST Science Tools

[Data Challenge II: \(DCII\)](#)

Welcome to the GLAST Science Analysis Tools tutorial. This section of the workbook, characterized by the blue navbar, is intended to introduce you to the tools that will be used to analyze the LAT Science Data (i.e., the Level 1 data in FT1 format).

Navigating the Science Tools Section of the Workbook

After the "Home: SciTools" and the "Software Setup" button, the next **five buttons launch 2nd-level navbars with buttons for launching the tutorials** listed below:

Science Tools for selection, binning, likelihood analyses, exposure map generators, pulsar analysis etc available for Linux & Windows

Documentation, user guides and science threads (source analysis, burst analysis, etc.) under development

Software uses standard HEASoft interface

Burst spectra compatible with XSPEC

Compatibility with XSELECT under development

fgui for analysis/scripting



Tasks in Progress

- Almost all FITS file formats for LAT and GBM finalized
- Distribution of Automated Science Processing products being finalized
- Relevant Documents: GSSC-HEASARC MOU: out for signatures; GSSC-HEASARC Interface Control Document in draft; PDMP being baselined
- Draft Browse tables defined, limited testing; structure of catalogs still in flux
- Prototype GLAST CALDB in construction; CALDB/GLAST definition document draft
- Agreement reached bet. GSSC and NSSDC to deep archive GLAST Level 0 data
- GLAST Hardware (beowulf cluster, hard disks) purchased